

solution until a larger series of skulls of these species can be procured, and until the other parts of the skeleton can be compared; it being always borne in mind, at least according to my experience, that the skulls and other parts of the skeleton of the animals are quite as liable to vary in form and structure as any of the external soft parts by which they are moulded.

2. ON THE GENUS *NECTURUS* OR *MENOBANCHUS*, WITH AN ACCOUNT OF ITS SKULL AND TEETH. BY DR. JOHN EDWARD GRAY, F.R.S., F.L.S., V.P.Z. & ENT. SOC. ETC.

Dr. Kaup lately sent to me the skull of the *Proteus of the Lakes*, *Necturus maculatus*. As it presents some peculiarities, I am induced to lay a figure and some observations on it before the Society.

1. It is the general belief of the inhabitants of Lake Erie that the bite of the *Proteus of the Lakes* is poisonous.

Dr. Holbrook observes that the fishermen regard these animals "as poisonous, and are consequently seldom taken in hand."

The Hon. Miss Amelia Murray in her 'Letters' mentions this animal as caught in a net at Detroit, under the name of *Fish Lizard* (vol. i. p. 172), and observes: "The fishermen said its bite was very poisonous, and it had the yellowish-brown lurid look which seems to appertain to venomous reptiles; but Dr. Kirtland says it is perfectly harmless."

And this latter opinion appears to be the almost unanimous impression of the naturalists of America.

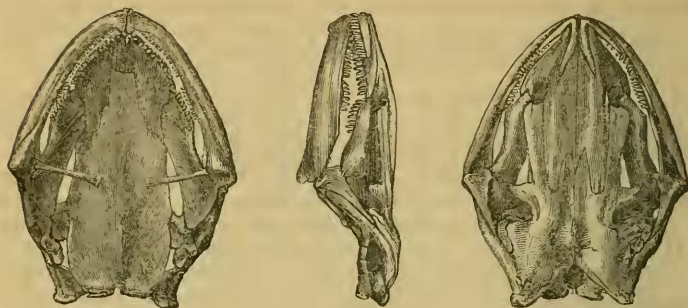
Yet the examination of the teeth will almost justify the popular belief, and at least render it very desirable that the animal should be examined in its living state, and that its bite be submitted to careful experiment.

The upper jaw of the skull is furnished with two series of small, acute, uniform, nearly transparent, conical, slightly curved teeth, the outer series being placed on the narrow intermaxillary bone, the inner series on the front edge of the vomer and on the outer edge of the lateral processes of the pterygoid bone. The lower jaw has a single series of similar teeth, which lock between the two series above described.

All these teeth have a conical cavity on the hinder part of their base, with a short linear slit on the middle of the inner side, and an oblong perforation above the slit in the middle of the inner side of the tooth. The form of these teeth is exactly similar to the fang of poisonous Serpents; that is to say, the cavity is not a hollow in the substance of the tooth itself, but is formed by the sides of the teeth being produced and folded together, leaving a conical cavity in the inner side of the base, as is easily proved by the examination of the teeth, which shows that the cavity is lined with enamel; and the junction of the two lateral expansions is rarely complete, but marked by a more or less distinct or continued slit between the basal notch and the subcentral foramen. In the poisonous Snakes the duct of

the poison occupies this cavity ; and the similarity of the form and structure leads to the idea that it may be used for the same purpose in the *Proteus of the Lakes*.

The chief difference between the teeth of the *Proteus of the Lakes* and the fangs of Serpents, is, that in the former the upper aperture of the cavity is nearer to the centre of the tooth, some distance from the apex, while in the fang of the Serpent it is generally near to the tip.



I know of no other instance of a Batrachian having this structure of its teeth, nor do I know any instance, except in the Mexican Lizard, called *Heloderma horrida*, in which *all the teeth* are uniformly furnished with a basal cavity and foramen ; and this Lizard is said to be noxious, but the fact has not been distinctly proved.

2. When Dr. Barton, in his paper on the *Siren*, first described the Hell-bender (*Protonopsis horrida*), he considered the *Proteus of the Lakes* as the young state of the latter species.

The skull bears more affinity to the skull of that animal than to any other Batrachian, and the difference between them is just such as one might expect between the larva and adult of other similar animals ; and it will be observed that the *Proteus of the Lakes* is only known in its larva-like state, and *Protonopsis*, as far as I know, only in its adult form.

The first great, and indeed almost insurmountable, argument against regarding the *Proteus of the Lakes* and the Hell-bender as two states of the same species, is the geographical distribution of the animals as given by the American herpetologist.

Thus Holbrook, for example, states, "The *Menopoma Alleghaniensis* (Hell-bender) is found in the Alleghany river and its tributaries, and doubtless inhabits many of the branches of the Ohio and Mississippi rivers ;" and *M. fusca*, "the waters of the mountainous regions of North Carolina and Georgia ;" while the *Proteus of the Lakes* (*Menobranchnus maculatus*) has as yet been found only in Lake Champlain and Lake Erie and their tributary streams.

It is true that a second species of the genus, *Menopoma lateralis*, according to Dr. Holbrook, "has a wide range, it being found in many of the rivers and streams that open into the Mississippi on its eastern

side ; but I am not aware of its existence west of that river. Say found it as far north as Pittsburg in Pennsylvania, and Troost as far south as Cumberland river in Tennessee :” and further, “the *Menobranchnus lateralis* was first described by Say from a specimen taken by a hook in the Alleghany river.” He proceeds : “At first I was disposed to believe that the *M. maculatus* and *M. lateralis* were one and the same animal, but I am now convinced that the latter is at least a well-marked variety, if not a distinct species ; it is more slender in proportion, its colours and markings different ; it is found only in the western waters that run into the Mississippi, while the former inhabits the rivers and streams that flow into the northern lakes, and all the tributaries of the St. Lawrence river.”

From these remarks on the observations of other American herpetologists, one may conclude, that though one species or variety of *Menobranchnus* is found in the same system of waters as the *Menopoma*, the *Menopoma* has not hitherto been observed in the same lakes, or indeed in the same district of country, where one variety or species, viz. the *Menobranchnus maculatus*, is alone found, and where it is abundant.

But an experienced American naturalist, Dr. Baird, has observed, that “the non-discovery of the adult is no argument against its existence. I had caught hundreds of the very remarkable larva of *Pseudotriton Salmoeneus* near Carlisle, before I found an adult.” (Journ. Acad. N. Sci. Philad. 1849, 292.)

Dr. Holbrook observes, that “the *Menobranchnus maculatus* is seldom taken except in the months of April and May, which is their spawning season. Their eggs are about the size of peas, and as many as one hundred and fifty have been counted in a single female.”

This would lead one to believe that they are adult animals ; but eggs have been equally found in the *Axolotl* of Mexico, which is regarded by most naturalists as a larva.

3. It is to be observed, that though the *Proteus of the Lakes* (*Necturus*) has a more distinct and separate opercular flap, united by a distinct fold under the throat, than either the *Proteus* of Carniola or the *Siren*, and in this respect more nearly resembles the *Axolotl* of Mexico and the larva of *Tritons*—yet, that, like the *Proteus anguinus* and the *Siren*, it has only two slits on each side of the neck, with a single free ray between them, the anterior and posterior cartilaginous ray being united to the skin, as in those genera ; while the *Axolotl* and the larva of *Tritons* have the gill flat, quite free from the gill-rays, and there are three slits between the gill-rays as well as the larger anterior one, making four slits on each side, and the inner edge of the rays being toothed as in fishes.

From these considerations I am inclined for the present to consider the *Proteus of the Lakes* as a distinct kind of Batrachian, which is arrested in its development and never reaches the perfect state.

The skull is much more developed than in the other genera of *Meantia*, and in its outline and disposition of its teeth it resembles that of the genus *Protonopsis* as figured by Cuvier (Oss. Foss. ii.

409. t. 26. f. 3, 4, 5), but there are no maxillary bones, and the nasal and frontals are more developed.

The exterior nostrils are on the upper surface of the margin of the nose, above the first third of the upper lip; and the inner nostrils are large, and, as in the other *Meantia*, not on the palate, but on the side of the mouth between the lips and the outer edge, near the hinder part of the series of vomerine teeth, nearly as they are in the genus *Axolotl*, well figured by M. Bibron (Herpet. t. 95. f. 2 a).

4. I may observe, that we have specimens both of *Necturus maculatus* and *N. lateralis* in the British Museum, the latter from the Ohio; and I cannot discover any difference between them, except that the one named *N. lateralis* has two broad, pale, dorsal streaks, and is about half the size of the other specimens; and I doubt if these dorsal streaks are not the result of youth, and vanish as the animal increases in size, as is the case with the *Siren*.

5. While on these animals, I may observe, that Dr. Garden's specimen of *Siren* that was originally described by Ellis, which is now in the British Museum, shows a number of lines of mucous pores on the chin and on the head, the latter not being so distinct as the former, and a very distinct series of oblong white spots, forming an interrupted line along the upper part of the sides of the body, and continued to the middle of the sides of the tail; the spots on the hinder part of the body and tail being larger, more distinct, and closer. These spots evidently represent the lateral lines in *Tritons* and fish, and I have seen them mentioned in the modern descriptions of the animal.

3. DESCRIPTIONS OF THREE NEW AND VERY BEAUTIFUL SPECIES OF BIRDS, FROM GUATEMALA AND FROM THE ISLAND OF LOMBOCK. BY JOHN GOULD, ESQ., F.R.S., V.P.Z.S. ETC.

(Aves, Pl. CXXIII.)

COTINGA AMABILIS. (Pl. CXXIII.)

Male. Head, lores, line beneath the eye, all the upper surface, lesser wing-coverts, upper tail-coverts, sides of the chest, band across the breast, flanks, vent and under tail-coverts fine verditer blue; wings dull black, the greater coverts, spurious wing and the secondaries margined with verditer blue; tail dull black, margined externally with dull verditer blue; chin, throat and centre of the abdomen very rich purple.

Female. Upper surface greenish-brown, each feather tipped with greyish-white; under surface greyish-white, with dark brown centres to the feathers of the breast, upper part of the abdomen, and flanks; vent and under tail-coverts dull white.

Total length, 8 inches; bill, $\frac{3}{4}$; wing, $4\frac{1}{2}$; tail, $2\frac{3}{4}$; tarsus, $\frac{7}{8}$.

Hab. Guatemala.

Remark.—The *Cotinga amabilis* forms one of the most beautiful